SUNRISE TELECOM®

CM2800™

Sweep System, Spectrum and Cable Modem Network Analyzer

Data Sheet

Sunrise Telecom's new CaLan® compatible CM2800 Sweep System and Cable Modem Network Analyzer is the latest addition to our installation, service and plant verification testing and troubleshooting solutions. An intuitive user interface, VGA color touch screen and Windows CE™ operating system combined with a comprehensive measurement suite and an extensive PC toolkit simplify and speed plant maintenance and increase quality of service.

The WinCE Operating System helps protect your investment, provides future flexibility and allows the addition of many PC like functions, providing a one instrument solution.

KEY FEATURES

- High resolution true non-interfering 5 to 1100 MHz downstream sweep system with Manual & Automatic Gain & Slope Offsets
- Future proof flexible and upgradeable DSP software defined receiver technology.
- Fast 5 to 200 MHz upstream sweep, plus ingress detection and display
- Integrated DOCSIS® 2.0 analyzer with advanced 1 GHz SLM and QAM analyzer
- WiFi 802.11g Wireless USB Adapter option
- Fast 1 GHz Spectrum Analyzer with 1,000 MHz Span and 1 MHz to 30 kHz RBW
- 6.4" full VGA, color touch screen (daylight visible)
- Field replaceable 4+ hour continuous operation battery pack
- BPI+ and PacketCable™ digital certificates installed
- Weather and shock resistant
- Net-Tools: ping, trace, throughput and IP details via WiFi, Ethernet and cable modem
- Additional applications for live search, Telnet, SNMP, FTP, Remote Desktop plus options for WiFi, Signature Capture and more

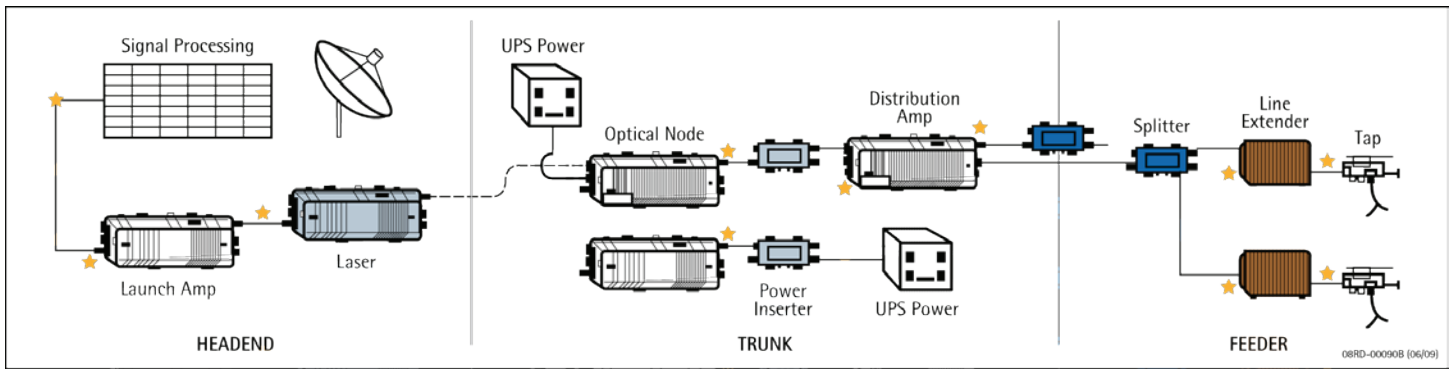
BENEFITS

- Provides cable TV technicians with a next-generation plant maintenance tool
- Easy-to-use WinCE system minimizes training and maximizes testing accuracy and consistency
- Compatible with existing CaLan sweep installations - works side by side with legacy deployments
- Open architecture design provides suppport for a variety of devices and future applications
- Use WiFi option, Ethernet or cable modem to access back office systems and manage test results
- Interfaces to the web-based realGATE™ Test Management system, providing a full array of management tools for tracking assets, analyzing test data and implementing workforce management

OPTIONAL FEATURES

- Advanced VoIP tests (MOS, R-factor, latency, jitter and lost packets)
- 64 QAM upstream generator/return pilot generator
- realVIEW™ client provides Remote US spectrum view from realWORX system
- CAD Viewer displays DWG and DXF strand maps and has Save and Red-line capability
- AT2500 Remote and Measurement Control software

PHOENIX DATACOM
NETWORK PERFORMANCE AND SECURITY



APPLICATIONS

Sweeping the network helps ensure that the frequency response from the Combiner through the RF Launch amplifiers and input to the lasers is flat and at the proper level. The same applies for the trunk and feeder distribution network, and even out to the end-of-the-line. Saved test results can be used as a reference, and thus sweep may be done from any point in the network.

Select the CM2800 for Annex B and C or CM2800E with 6 and 8 MHz IF systems for Annex A, B and C, then add the features that customize the CM2800 for your specific needs. Most features can be added in the field at any time.

Sweep System

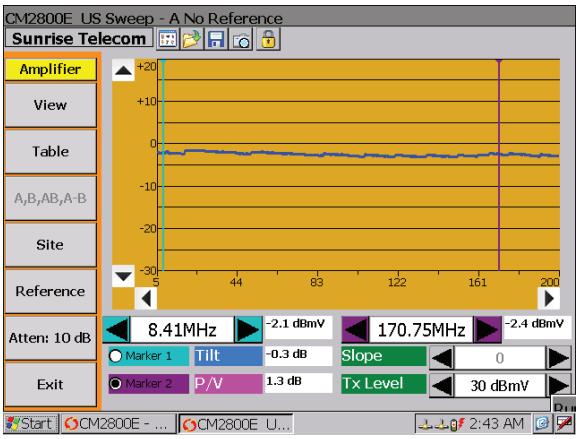
The CM2800 incorporates a CaLan compatible (CaLan 3010H or 3010R with option 052 and running the latest 5.53 firmware) downstream sweep receiver and an upstream sweep transmitter. CM2800 qualifies the network for today's expanding subscriber services, checking both downstream and upstream paths.

In addition to raw sweep measurements, sweep results can be automatically compared to reference traces to determine the difference or frequency response between any two points in the network. Manual and Automatic Gain & Slope allow a Reference to be used from any location.

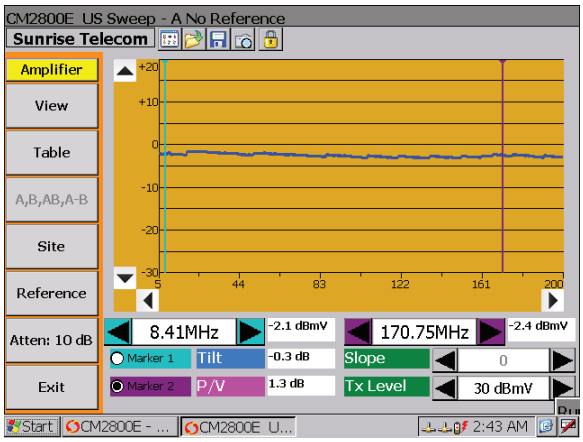
Site files can be created to help manage the field assets, their configuration, sweep references and results data. Users may even customize the records that they want to keep for any number of locations. Flash Card and USB memory, combined with the ability to upload and download files over the network, allow virtually unlimited storage of test results, reference files and site files.

Upstream Sweep

The CM2800 upstream transmitter covers the frequency range from 5 to 200 MHz, and transmitter output levels of 10 to 50 dBmV. Although diplexers limit the frequency response of the amplifiers, upstream lasers can be tested to their full 200 MHz capability.

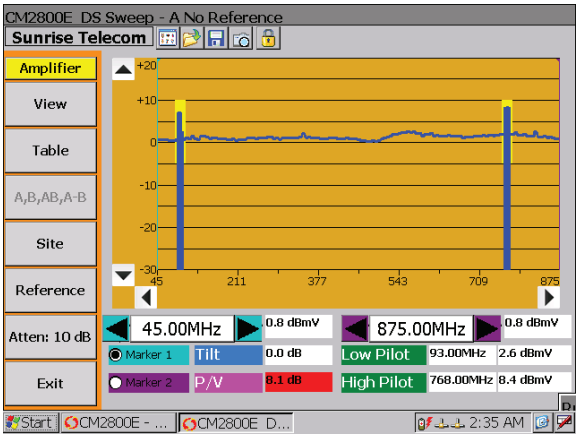


Ingress Warning Messages from the 3010 headend unit are displayed and allow display of the upstream spectrum. Switches attached to the 3010 headend simplify upstream monitoring with automatic polling of multiple upstream paths and display of the ingress.

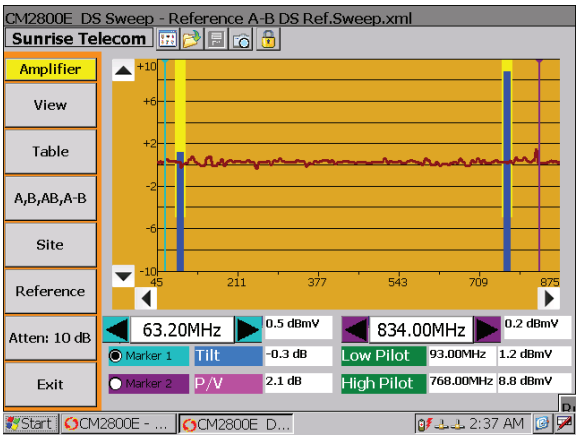


Downstream Sweep

Unparalleled sweep speed, accuracy and resolution combined with non-interference, make the CM2800 and 3010 the ideal downstream sweep solution. With a 5 to 1100 MHz frequency range, the user can view the utilized bandwidth and band edges of any network. Display controls allow the user to set start and stop or center frequency and scan or scroll through any portion of the spectrum.



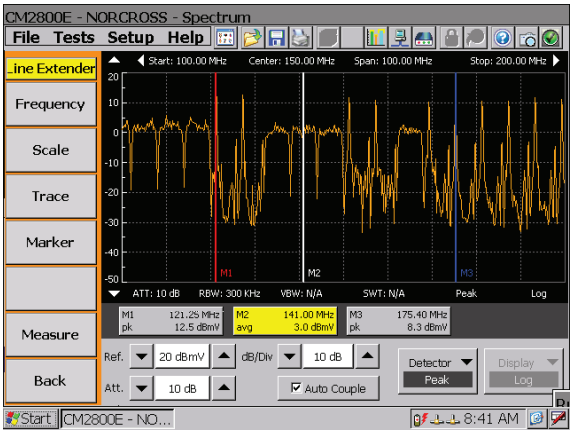
Simultaneous display of the low and high pilot with pass/fail limits and the sweep trace make network setup and balancing simple and fast. Sweep Trace smoothing and averaging help make display interpretation simple and foolproof along with direct Tilt and Peak-to-Valley measurements.



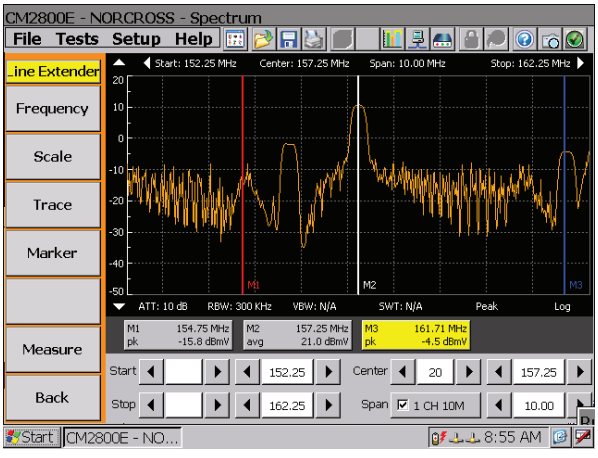
Marker settings, reference files, smoothing and averaging are all saved and recalled the next time the sweep function is used.

Spectrum Analyzer

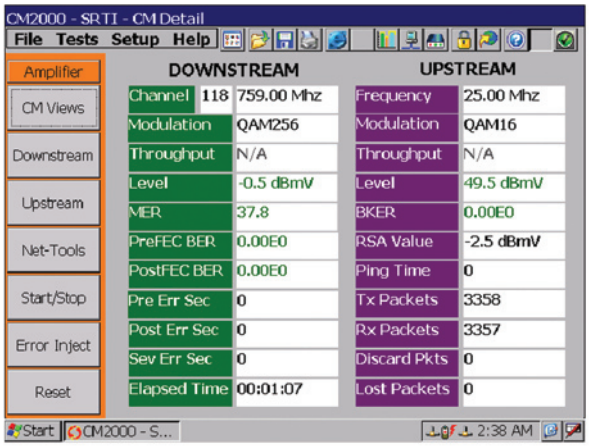
The CM2800 incorporates a 5 to 1100 MHz downstream and 5 to 120 MHz upstream spectrum analyzer. The user may select a Center Frequency or Channel and Span, Start Stop frequency to make level measurements, view ingress, noise, or impairments. Three markers are provided for frequency and level readout. Markers may be configured to make peak level (RMS of peak) measurements for analog signals or average power level measurements across a specified bandwidth for digital carrier level measurements.



Attenuation and Reference level controls allow the user to scale the signal level and position it on the display in 10 dB, 5 dB, 2 dB or 1 dB per division. A Peak Hold function provides a second trace of the maximum level obtained over successive sweeps, which is essential in measuring impulse noise and ingress in forward or return systems.

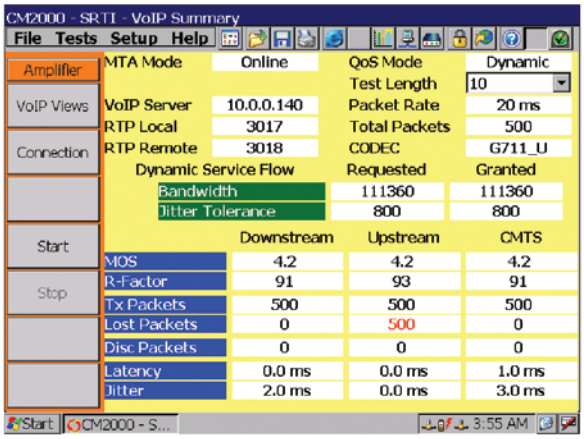


The upstream spectrum analyzer incorporates a 100 MHz low pass filter to isolate the lower band of frequencies and reduce the likelihood higher level downstream signals are overloading the analyzer.



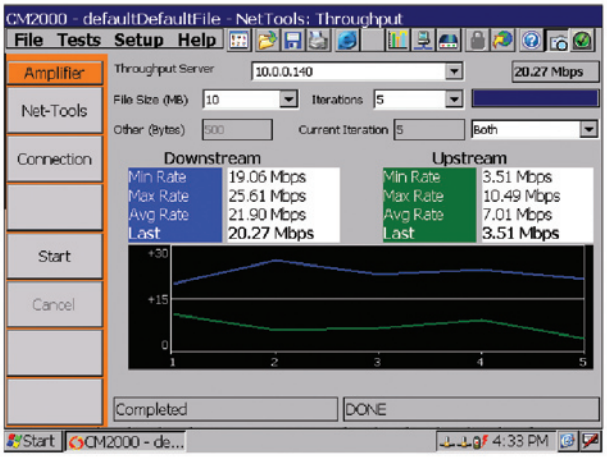
Cable Modem

Complete modem range and register data is provided for testing the upstream and downstream path. Key features include selectable DS channels, UCDs and DOCSIS mode. Results include comprehensive upstream and downstream network performance data. Additional testing includes network tools like PING, traceroute and throughput tests. Throughput testing is capable of up to 22 Mb/s downstream and 18 Mb/s upstream. A DOCSIS 3.0 automated testing firmware option is available to automate sequential testing of bonded DOCSIS 3.0 channels. See the CM2-D3 DOCSIS 3.0 Analysis Option data sheet for details on this option.



VoIP Option

The VoIP option provides a detailed analysis of the upstream and downstream service flows, as well as the round trip analysis between the test point and the CMTS. Measurement results include: MOS, R-factor, jitter, latency and lost packets. The user may adjust the duration of the test for a quick test, or as required to identify long term or intermittent impairments. Measurements can be made without provisioning the MTA. If the MTA is provisioned, a customer's handset can be plugged in to make or receive calls.



Throughput Tests

Upstream and downstream throughput tests are displayed over time as multiple tests are run, and may be performed via the RF cable modem or Ethernet connection to the home network or modem. File sizes and the number of tests may be selected to best duplicate the customer's experience.

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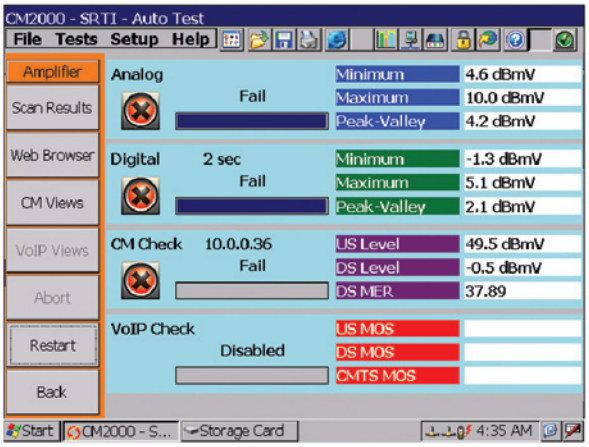
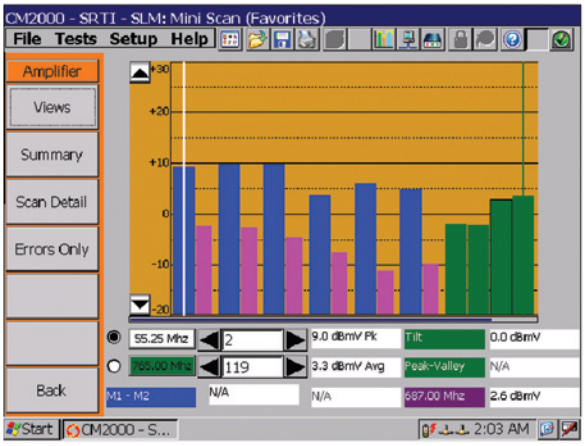
WinCE PC Tools

The WinCE Internet Explorer web browser provides a PC-like browsing experience with full VGA display. Browse to CMTS data, diagnostics, e-mail, provisioning pages or live websites via the Ethernet, 802.11g wireless WiFi or cable modem Interface.



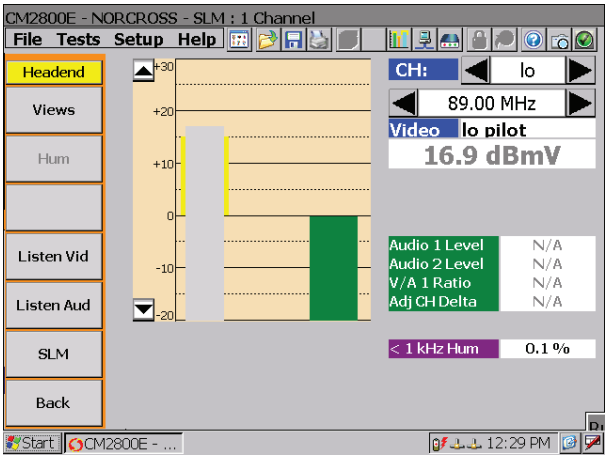
Auto-Tests

Nine administrator programmable auto-tests provide comprehensive and consistent testing of analog and digital signals, cable modem and VoIP services. Select the tests, the pass/fail limits and the channels to be tested on each of the nine configurable auto-tests. View summary results or detailed results of every measurement or just those outside of the pass/fail limits.



Mini-Scan

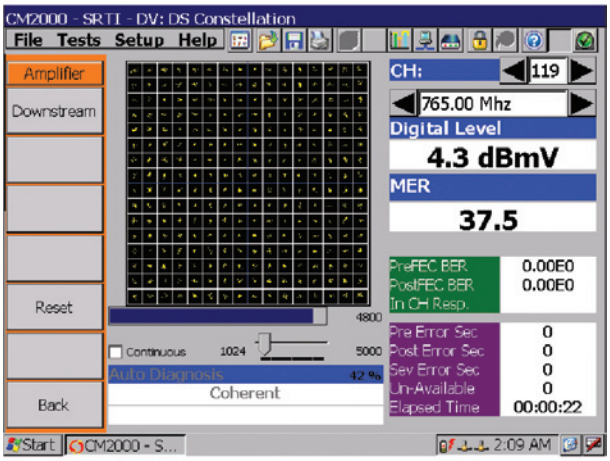
SLM mini-scan provides a quick view of the key channel levels, with peak and average measurement markers, plus tilt and peak-to-valley. Select any 2 to 150, and view the results on a simple bar graph with pass/fail indication. A full scan is also available to scan through the entire channel plan of analog and digital channels. Scan and Mini Scan are incredibly fast, scanning up to 100 channels in less than two seconds.



SLM Tests (Analog)

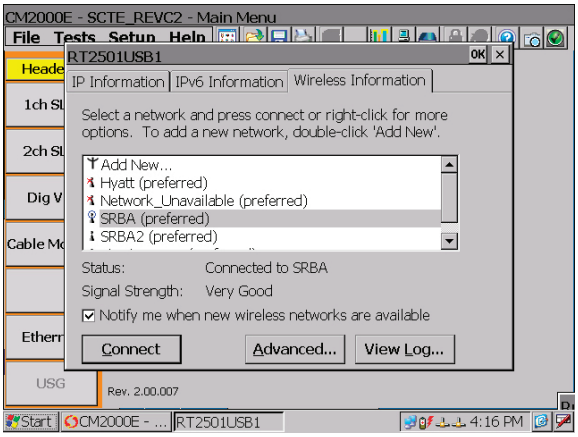
The SLM (signal level meter) automatically switches between analog and digital mode, depending on the channel plan setup. Both numeric and graphic results are displayed with measurements of the analog channel video and audio carrier, second audio (if used) and the upper adjacent channel. A HUM measurement function provides composite (0 to 1 kHz) HUM measurements on a CW carrier with input levels as low as -20 dBmV.

A two channel mode offers a quick rough balance tool to view any two channels simultaneously. dBmV or dBuV units of measurement are user selectable.



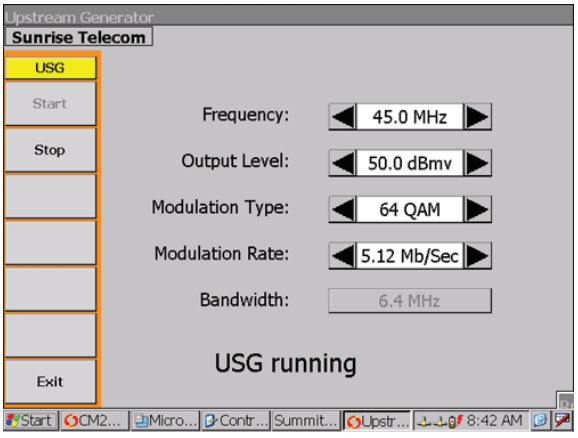
QAM Analyzer

The QAM option provides constellation, equalizer and frequency response displays for digital video and downstream cable modem signal analysis, plus a downstream spectrum display and STATS mode. STATS mode provides critical measurement data over time, aiding in troubleshooting intermittent faults. Results include an auto-diagnostic mode that helps identify network impairments.



WiFi USB Adapter Option

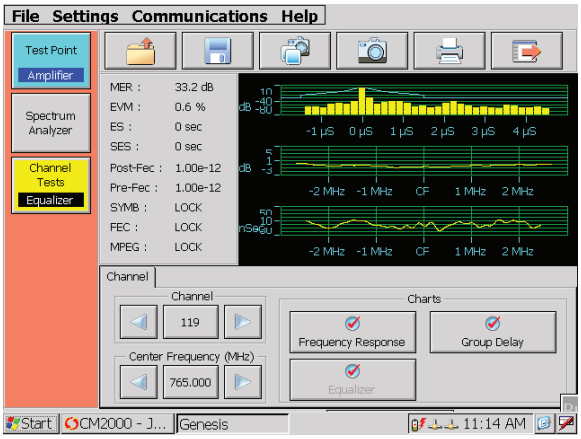
The USB WiFi adapter is automatically recognized when plugged into the USB port. The WiFi adapter provides connectivity to any 802.11g compatible network and may be used to test and troubleshoot in-home networks. WiFi tools include IP Detail, Ping, Traceroute, Throughput, Web Browser, Telnet SNMP, FTP and more.



CM2-USG Option (Hardware Required)

CM2-ATremote Optional firmware for the CM2800 allows remote control and remote viewing of test results. Upstream and Downstream spectrum measurements as well as individual channel measurements and digital analysis is included. Digital measurements include MER, Pre FEC BER, Post FEC BER, Frequency Response and Group Delay, in addition to Constellation and Equalizer graphic displays.

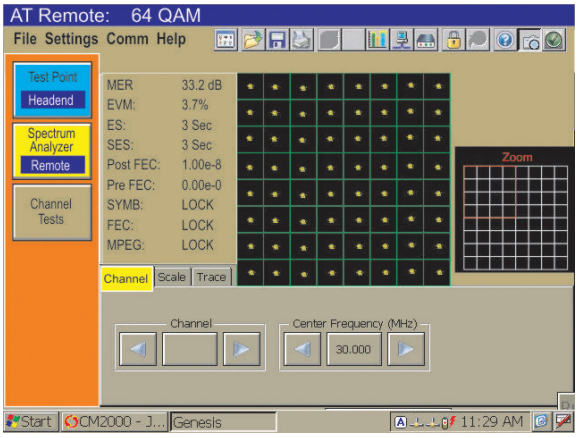
- Remote AT2500 control via the network
- View test results on the CM2800
- Use with USG Option for one man Upstream testing



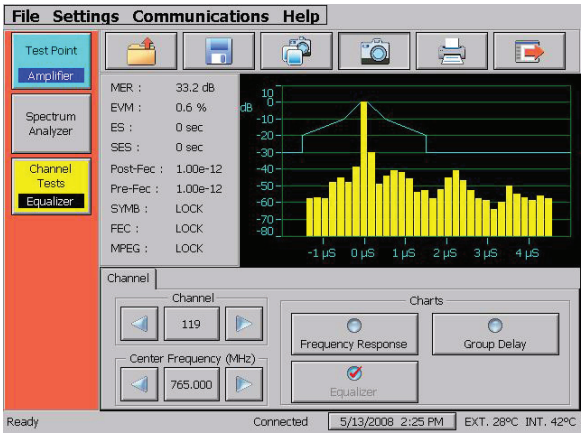
CM2-ATremote Software Option

Remote operation of the AT2500RQ spectrum analyzer in both spectrum and QAM modes provide an ideal one-man upstream testing solution. The actual spectrum display results can be viewed on the CM2800 screen, with full access to control functions such as span, frequency, amplitude and resolution bandwidth. The QAM mode provides access to digital measurements including MER, Pre FEC BER, Post FEC BER, Constelllaiton, Frequency Response Equalizer and Group Delay Remote.

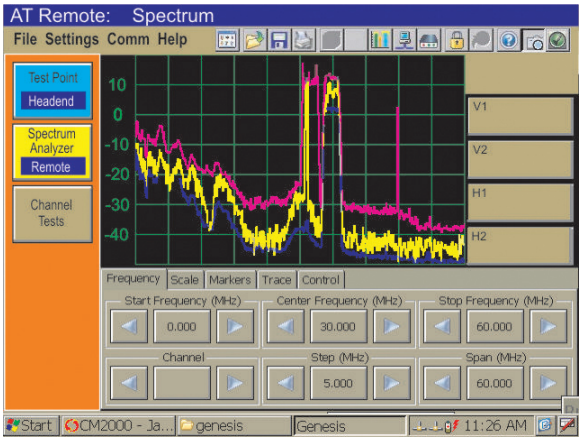
- View remote AT2500 test results on the CM2800
- Use with USG Option for one man Upstream testing
- Includes Spectrum Analysis display



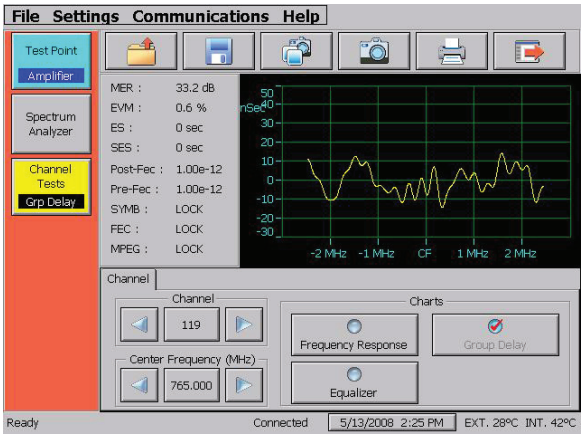
Upstream Constellation



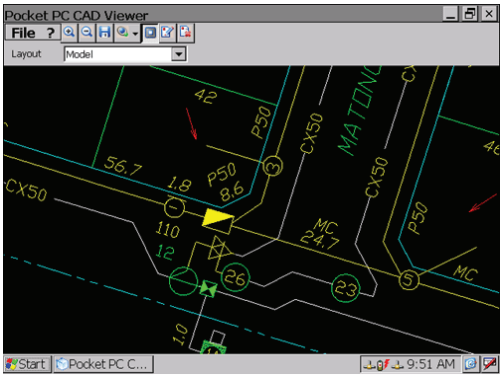
Upstream Equalizer Stress



Upstream Spectrum



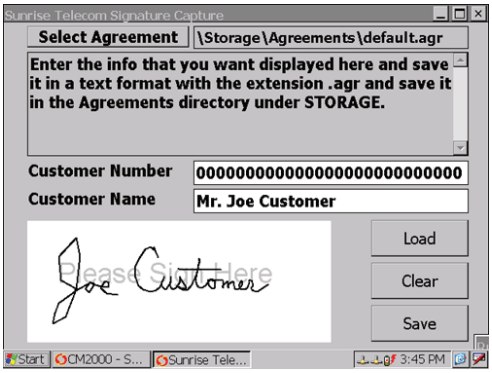
Upstream Group Delay



CM2-CAD Strand Map Viewer Option

CM2-CAD optional firmware for the CM2800 provides a viewer to display DXF or DWG maps. Includes excellent zoom and scroll controls, and the ability to red-line and save map files. Download files over the network or from a CF card or USB drive. Trial Version included.

- Zoom and scroll capability
- Red-line markup and Save functions



CM2-SIGN Signature Capture Option

CM2-SIGN optional firmware for the CM2800 allows the system to load their own agreement forms and then select the desired agreement to capture the customer's signature, name and customer number all in a single secure file.

- Capture signatures in the field on the touch screen
- Select from multiple user customizable agreements

SPECIFICATIONS

Physical Dimensions

7"H × 10"W × 4"D
(17.5 cm H × 25.4 cm W × 10.2 cm D)
Weight: approximately 6 lbs.

Power:

Battery Pack Li-ION
AC/DC Charging
Charging Time: 2–3 hrs
Operating Time: 4-6 hrs continuous, 8-12 hours typical in battery saver mode.

Environment

0°C to 50°C
Humidity (non-condensing): 95%

Display Type:

Color VGA Touch Screen (640 × 480)
Backlight: Yes (auto off)
Daylight viewable

Tuning

Sweep and SLM Frequency range
5 MHz to 200 MHz US
5 to 1100 MHz DS
QAM Analyzer Frequency Range
CM2800: 50 MHz to 1100 MHz
CM2800E: 80 MHz to1100 MHz
Cable Modem Frequency Range:
CM2800: 5 to 42 MHz US and 50 MHz to 1100 MHz DS
CM2800E: 5 MHz to 65 MHz US and 80 MHz to 1100 MHz DS
Channel and Frequency Tuning

Measurements

Upstream and Downstream Sweep
Analog and Digital SLM
Digital QAM Analysis
Cable Modem
Spectrum Display (upstream and optional downstream)
VoIP Option (MOS, R-factor, jitter, latency and lost packets)
Programmable Automated Tests
Ping and TraceRoute (RF, Ethernet and WiFi (optional))
Throughput (18 Mb upstream, 22 Mb downstream and 30 Mb Ethernet)

DOCSIS® Compatible: 1.0, 1.1 and 2.0

CM2000E DOCSIS and EuroDOCSIS compatible.

Data Storage

Test results and Screen capture

CE and UL certified

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NETWORK PERFORMANCE AND SECURITY

ACCESSORIES:

Standard: User's manual, carry strap, AC battery charger, internal battery pack, spare connectors, carry case, vehicle charger, strand hooks and System Editor PC software.

ORDERING INFORMATION

CM2800	Annex B and C Sweep System and Cable modem Network Analyzer; includes analog and digital SLM and cable modem testing. Deep interleave for digital video and web browser included.
CM2800E	Annex A, B and C Sweep System and Cable modem Network Analyzer; 6 and 8 MHz IF for DOCSIS and EuroDOCSIS; includes analog and digital SLM and cable modem testing. Deep interleave for digital video and web browser included.
CM2800-USG	CM2800 with Upstream Signal Generator; allows insertion of continuous true DOCSIS upstream signal up to 64 QAM for MER and BER measurement. See Upstream Toolkit data sheet.
CM2800E-USG	CM2800E with Upstream Signal Generator allows insertion of continuos true DOCSIS upstream signal up to 64 QAM for MER and BER measurement. See Upstream Toolkit data sheet.

OPTIONS

CM2-D3	DOCSIS 3.0 Analysis firmware allows automated sequenctial analysis of DOCSIS 3.0 bonded channels. Automatically analyses up to 4 US and 4 DS bonded channels.
CM2-VoIP	Option to add VoIP tests, including upstream and downstream MOS, R-factor, jitter, latency and lost packets. Also provides the ability to plug in a handset to place/receive calls.
CM2-WiFi	802.11g Wireless USB Adapter adds WiFi connectivity. Test and validate in-home networks-trace, throughput, web browser, FTP, SNMP and more.
CM2-SIGN	Signature Capture software option to allow user to install custom agreements and collect customer signatures.
CM2-CAD	DXF and DWG Strand Map Viewer with Red-line function
CM2-PSC	Protective screen covers
CM2-BAT.	Optional spare battery pack
CM2-RVIEW	Optional Remote Upstream realVIEW display from realWORX serve
CM2-ATremote	Remote optional software for remote control of AT2500 via network connection.

supplied and supported in the UK by Phoenix Datacom
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